UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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JENNIFER S. FISCHMAN,

Plaintiff, Index No. 18-cv-08188 (JMF)

v.

MITSUBISHI CHEMICAL HOLDINGS AMERICA, INC.; MITSUBISHI CHEMICAL CORPORATION; MITSUBISHI CHEMICAL HOLDINGS CORPORATION; NICHOLAS OLIVA, in his individual and professional capacities; DONNA COSTA, in her individual and professional capacities; and JOHN DOES 1-10, in their individual and professional Capacities,

Defendants.

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I, Gerald M. LaPorte, B.S., B. Commerce, M.S.F.S., declare the following:

1. I have personal knowledge of the matters testified to herein, and if called upon to do so, would competently testify thereto. I am a Forensic Chemist and Document Dating Specialist with Riley Welch LaPorte & Associates Forensic Laboratories.

2. On August 4, 2021, I issued an expert report in this matter in which I provided my qualifications, a description of the documents I examined, the bases for the methods used for the testing, the results from my examinations and testing, and my expert opinions ("LaPorte Expert Report"). A true and correct copy of the LaPorte Expert Report is attached hereto as **Exhibit 1**.

3. On October 7, 2021, I was deposed in this matter ("LaPorte Deposition"). A true and correct copy of the LaPorte Deposition is attached hereto as **Exhibit 2**.

4. Based on my professional experience, established scientific principles, and full consideration of the testing results, the following are the opinions I rendered in the LaPorte Expert Report:[1]

(a) It is highly probable[2] that the handwritten entries on both sides of Q8 (000830/000831) were not executed on the purported date of March 1, 2016. Instead, the written entries were executed within two (2) years before I performed my testing, which would have been sometime after July 31, 2019. Due to the extremely high levels of 2-PE[3] and the average SLR[4] of 31%, the results are consistent with the writing being executed as early as sometime in the past six (6) months.

(b) It is probable[5] that the handwritten notes on Q12 (000835) were not created until after July 31, 2019, which would be some time in the two (2) years prior to my analysis. The results from the chemical testing are not consistent with an ink that is allegedly 4 ½ years old and are far more supportive of an ink that is less than two (2) years old.

(c) Q1 has been altered with the addition of two (2) entries reading, "corp. (Plus Aldila Inc.)" and "MCC Genomatica litigation".

[1] See Section VIII (Conclusions) on paragraph 46 (page 23) of the LaPorte Expert Report.
[2] The forensic document community relies on the Scientific Working Group for Forensic Document Examiners: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. "Highly Probable" is used to describe evidence that is very persuasive, and the examiner is virtually certain, but there is some factor that precludes the examiner from reaching absolute certainty. The "highly probable" threshold is one of virtual certainty based on the results from the examination and testing.
[3] 2-Phenoxyethanol (2-PE) is further described in paragraph 13 of this Declaration.
[4] Solvent Loss Ratio (SLR) is further described in paragraph 19 of this Declaration.
[5] The forensic document community relies on the Scientific Working Group for Forensic Document Examiners: Standard Terminology for Expressing Conclusions of Forensic Document Examiners. "Probable" is used to describe strong evidence that is persuasive. The "probable" conclusion is one of very high confidence based on the results from the examination and testing.

(d) The two (2) entries reading, "corp. (Plus Aldila Inc.)" and "MCC Genomatica litigation" were executed when the pages were on top of Q8 (000835), which means that the two (2) entries must have been written on or after Q8 came into existence.

(e) Q8 has been altered with the addition of the date "3/1/16".

(f) With respect to Q6 (000828), nearly all the handwritten entries were executed with blue non-ballpoint writing ink (e.g., gel ink, felt tip pens, and roller-ball pens); however, there are no generally accepted methods to estimate the age since non-ballpoint inks are primarily water-based and do not contain solvents that persist over months or years like ballpoint inks; and

(g) While I did examine the remaining documents, I did not perform ink dating analysis and therefore, I cannot conclude whether the written entries on Q1 (000788), Q5 (000827), and Q11 (0000834) were executed sometime within the past two (2) years.

5. I have reviewed Plaintiff's Memorandum of Law in Opposition to Defendants' Motion for Sanctions filed on November 22, 2021 ("Plaintiff's Memorandum").

6. Plaintiff disputes Opinions (a), (b), and (e) from the LaPorte Expert Report (as set forth above and in paragraph 46 of that report). Plaintiff does not dispute opinions (c), (d), (f), and (g). Therefore, this Declaration will focus on Plaintiff's dispute with opinions (a), (b), and (e). However, my Opinion (e) did not involve ink dating analysis, and Plaintiff's Memorandum does not dispute the method I used to determine that "3/1/16" was not executed contemporaneously with the handwritten notes since it was written with a different pen ink.

7. Plaintiff's Memorandum conveys a lack of scientific understanding of the widely accepted methodology to chemically analyze ballpoint writing inks, and the interpretation of the testing results, to estimate the age of the ink used on the Q8 (000830/000831) and Q12 (000835)

documents at issue in this matter ("Questioned Documents"). The methodology I used in this case has been used and accepted in numerous Federal, State, County, Municipal, and International Courts by many ink dating experts.

8. First, to state the obvious, Plaintiff has not presented any expert testimony to rebut mine.

9. Plaintiff's Memorandum falsely asserts that the ink dating method is based on 'my' theory and 'my' claims[6] and that my opinions are based upon theory and techniques that have not been adequately tested, have high potential for error, and have not been generally accepted within a relevant scientific or other expert community.[7] This is all incorrect. The method of analysis used in this case is based on extensive research over the course of multiple decades by forensic laboratories throughout the world including the United States, Russia, Germany, Canada, and Sweden as well as comparisons with known aged samples, and validation studies.

10. I performed extensive quality control testing to ensure the accuracy and reliability of the testing results. Based on the replicated testing results, there is no indication that the testing results are unreliable. Plaintiff's Memorandum does not dispute the testing results and has not provided evidence that the testing results are erroneous. Nor has Plaintiff presented an ink dating expert in this matter to dispute my testing results.

11. Equally incorrectly, Plaintiff repeatedly misunderstands or misrepresents the scientific articles she relies on in her opposition argument. Plaintiff's Memorandum frequently extracts selective quotes from these articles, but omits critical contextual information—leading her to mischaracterize the results, findings, and conclusions from these studies. Also, Plaintiff's Memorandum references several studies published in the 1990s and early 2000s which are now

[6] *Ibid*

[7] See paragraph 2 on page 7 of 30 in Plaintiff's Memorandum.

out of date; indeed, our knowledge and the methodologies for ink dating have evolved into a highly accurate and reliable analytical method.

12. The reasons and bases for the testing I performed were presented in the LaPorte Expert Report. The testing I performed relies on an analytical method known as gas chromatography/mass spectrometry (GC/MS), a methodology I will reiterate here to rebut the numerous misunderstandings and misrepresentations presented in Plaintiff's Memorandum.

13. GC/MS is routinely used for chemical analysis in laboratories throughout the world and is a method that can be used to identify different and specific substances in a test sample. GC/MS has many forensic applications, such as the analysis of controlled substances/seized drugs, fire debris and explosives, drugs and poisons, environmental samples, and the chemical identification of unknown materials. With respect to ink analysis, GC/MS is used to identify and measure a volatile organic compound (VOC) that is commonly found in ballpoint inks, known as 2-phenoxyethanol (2-PE).[8]

14. I have been using GC/MS for 29 years. With respect to ink dating, I have conducted testing on hundreds of ink samples, likely surpassing well over 1000 ink dating tests. I also conducted GC/MS on thousands of other types of samples, including drugs and unknown materials in operational government laboratories even before beginning my employment with the United States Secret Service in 2001. Then, while at the United States Secret Service, I was responsible for operating and maintaining all analytical instruments, including a gas chromatograph/mass spectrometer, until I was promoted to the role of Chief Research Forensic Chemist. I have undergone extensive training and proficiency testing for the analysis of materials using GC/MS, including writing inks. As well, I have published numerous scientific papers, and I have written

[8] LaPorte G, Wilson J, Cantu A. The Identification of 2-Phenoxyethanol in Ballpoint Inks Using Gas Chromatography/Mass Spectrometry. J Forensic Sci, 2004; 49(1).

about the same methodology used in this case in a peer reviewed textbook, titled: **Forensic Chemistry Fundamentals and Applications** (*Chemical Analysis for the Scientific Examination of Questioned Documents*), which was noted in the LaPorte Expert Report.[9]

15. As discussed in the LaPorte Expert Report, during my Deposition, and in my book chapter, after ink is placed on a document, changes occur as the ink ages. One well known change is that the amount of the solvent, 2-PE, diminishes as the ink ages, and this continues up to 24 months after the ink has been placed on the document.[10,11,12,13,14,15] The evaporation of 2-PE from an ink is undisputed and was first reported in the scientific literature in 1985.[16] Ink manufacturers use 2-PE to facilitate the transfer of liquid ink to a piece of paper; the chemical then evaporates from the ink causing it to dry and affix to the surface of the paper. Therefore, the main purpose of 2-PE is fully consistent with the fact that 2-PE evaporates once the ink is placed on paper—indeed, that evaporation is a critical component in the drying process.

16. As an analogy, placing ballpoint ink on a piece of paper is like applying paint to the walls of a room. When the paint is applied, the solvents emit a strong odor, but over the course of time, the paint dries and the solvent dissipates until there is no longer a solvent odor in the room. Writing

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[9] See Paragraph 15 in the LaPorte Expert Report.

[10] Bügler JH, Buchner H, Dallmayer A. Characterization of ballpoint pen inks by thermal desorption and gas chromatography-mass spectrometry. J Forensic Sci, 2005; 50(5).

[11] Aginsky, VN. Measuring Ink Extractability as a Function of Age – Why the Relative Aging Approach is Unreliable and Why it is More Correct to Measure Ink Volatile Components than Dyes. Int. J of Forensic Document Examiners 1998; 4(3):214-230.

[12] Gaudreau M and Brazeau L. Ink Dating Using a Solvent Loss Ratio Method. Proceedings of the 60th Annual Conference for the American Society of Questioned Document Examiners, August 14-19, 2002.

[13] Brazeau L, Gaudreau M. Ballpoint Pen Inks: The Quantitative Analysis of Ink Solvents on Paper by Solid-Phase Microextraction. J Forensic Sci, 2007; 52(1): 209-215

[14] Bügler JH, Buchner H, Dallmayer A. Age determination of ballpoint ink by thermal desorption and gas chromatography-mass spectrometry. J Forensic Sci, 2008; 53(4):982-988.

[15] Andrasko, J. Some Examples of Applications of a Microthermal Desorption Device in the Forensic Laboratory. J. Forensic Sci, 2009: 54(5).

[16] Stewart LF. Ballpoint ink age determination by volatile component comparison—a preliminary study. J Forensic Sci 1985;30(2):405–11.

inks are very similar: the process of solvent evaporation and drying does not produce a strong odor like paint, but GC/MS can be used to detect trace amounts of solvents in writing inks.

17. For ink dating, GC/MS is used to measure differences in the concentration of 2-PE when samples of the questioned ink are unheated and heated. Based on this process, samples of the questioned ink are removed from the document, whereby one set of the samples is heated and the other set of samples is not heated. A greater concentration of 2-PE will evaporate from fresh ink compared to older ink when the samples are heated at a temperature of 70 degrees Celsius for 90 minutes.[17]

18. To evaluate the age of an ink, it is necessary to measure the ink's ability to 'free' 2-PE once it is placed on paper. Therefore, it is necessary to compare the content (or quantity) of 2-PE in the ink prior to and after the heating. This approach was introduced by Dr. Valery Aginsky in 1996.[18] Micro hole punches, measuring 0.5 millimeters, are taken from an ink entry using a specialized device and then separated into sets of 'Unheated Samples' and 'Heated Samples'. I removed the Unheated and Heated samples from ink lines that were similar in thickness (degree of pressure), appearance, and arrangement (distribution), and within the area of the ink line (referred to throughout this Declaration as 'Paired Ink Sampling').[19] The micro punch samples designated for Heating were placed in a ceramic dish with concave wells with the ink samples facing up to allow the 2-PE to evaporate, unabated, from the ink.

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[17] Bügler JH, Buchner H, Dallmayer A. Age determination of ballpoint ink by thermal desorption and gas chromatography-mass spectrometry. J Forensic Sci, 2008; 53(4):982-988. See page 985: "The value T1 = 70°C was selected as the low temperature for further experiments. This desorption temperature seemed to be best suited to differentiate between fresh and old ink entries."

[18] Aginsky, V.N. (1996). Dating and Characterizing Writing, Stamp Pad and Jet Printer Inks by Gas Chromatography/Mass Spectrometry. *International Journal of Forensic Document Examiners*, Vol. 2, No. 2, pp. 103-115.

[19] See LaPorte Deposition, page 88:10-25 and 89: 1-10.

19. The percentage, or ratio, of 2-PE evaporated from the ink after it undergoes heating (R%) is referred to as the solvent loss ratio (SLR) and is calculated as follows:

$$R\% = \frac{[(\text{concentration of 2-PE from the unheated ink}) - (\text{concentration of 2-PE from the heated ink})]}{[\text{concentration of 2-PE from the unheated ink}]} \times 100$$

If R% is larger than 25%, it shows that the natural aging of the ink is still in progress and the ink is less than two years old.[20] To increase the accuracy, precision, and reliability of the measurements, the GC/MS is programmed to use the Selected Ion Monitoring (SIM)[21] mode, which is specialized software that increases the sensitivity and specificity of the GC/MS to measure the amount of 2-PE in the Unheated and Heated samples.[22] It is important to note that many studies cited by Plaintiff, especially those from the 1990s and early 2000s, did not use SIM to measure the amount of 2-PE in their ink samples, so they were unable to detect sufficient levels of 2-PE in inks that were several months old.

20. There are factors that may cause the ink drying process to slow such as storage in extreme cold or cause an ink to dry faster such as exposure to extreme heat, but there are no known environmental factors that would be expected to cause an increase in the level of 2-PE.

21. Plaintiff either misunderstands or misrepresents the testing methodology. Plaintiff's Memorandum mischaracterizes the process as involving "an artificially heated sample."[23] But there is nothing "artificial" about applying heat to facilitate measurement. The purpose of heating

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[20] Gaudreau, M. and Brazeau, L. Ink Dating Using a Solvent Loss Ratio Method. Proceedings of the 60th Annual Conference of the American Society of Questioned Document Examiners, San Diego, California, August 14-19, 2002.

[21] Selected Ion Monitoring (SIM) allows the mass spectrometer to detect specific compounds with very high sensitivity. In SIM mode, the instrument is set to gather data at masses of interest, instead of stepping the mass filter over a wide range of masses.

[22] I use an internal standard, o-Cresol, to normalize sample-to-sample variation during the analysis. An internal standard is a known concentration of a substance that is present in every sample that is analyzed.

[23] See page 6 of 30 in Plaintiff's Memorandum: "*... and (2) measuring the ratio of 2-PE left over in an artificially heated ink sample – compared to an unheated sample".*

is to determine if the ink is still in a fresh stage – the heat does not accelerate the ink's aging process. Once again, using the paint analogy described above, if paint is applied the walls in a room, and the room is very hot, the solvents will emit at a much higher rate when the paint is fresh compared to when paint is older than two years old. Plaintiff's Memorandum demonstrates a fundamental misunderstanding of the method and appears to confuse the underlying theory with different controversial ink dating methods (that I did not use) that rely on the degradation of dyes when inks are 'artificially aged'. The method I used includes GC/MS analysis of the solvent 2-PE – and not artificial aging to measure dye degradation.

22. The use of a 25% solvent loss ratio threshold is intended to be a 'conservative' value to avoid false positive (erroneous) results.[24] Based on validation testing I have performed on ink samples of known ages, I have seen results in the 'high teens' for the solvent loss ratio when an ink is less than 2 years old.[25] Therefore, the testing, and the solvent loss ratio threshold of 25%, is designed to allow for marginal error and mitigate false positive results. The results from the testing are compelling in this case. The 2-PE levels in the ink used for the Questioned Documents were extremely high and the average solvent loss ratio for Q8 (000830/000831) was 31% based on duplicate testing. These same results would not be expected in an ink that is 5 years old. [26]

23. Plaintiff's Memorandum either confuses or misrepresents the point that the solvent loss ratio "*does not decrease uniformly with the age of a document*" and then falsely asserts that this calls into question the theory of ink dating.[27] Different inks are composed differently and have different ratios of ingredients which will affect the dynamics with which how the ink ages. This is very well known. However, as noted in the LaPorte Expert Report, my Deposition, and in this

[24] See LaPorte Deposition, page 142:1-18.
[25] See LaPorte Deposition, page 104:15-21.
[26] See paragraph 41 in the LaPorte Expert Report.
[27] See paragraph 2 on page 16 and continuing paragraph on page 17 of Plaintiff's Memorandum.

Declaration, it is well understood and proven scientifically that ballpoint inks cease to measurably change at 18-24 months old, but how an ink ages in the interim (up to 2 years) can be variable due to a combination of factors such as the type of paper, the storage conditions, and the formulation of the writing ink. Once again, Plaintiff has demonstrated a fundamental lack of understanding of ink aging dynamics and the fundamental underpinnings of ink dating. If the Q8 (000830/000831) document is 5 years old, as purported, the ink would be completely dry and would not have exhibited extremely high levels of 2-PE and an average solvent loss ratio of 33%. There have been no peer reviewed scientific reports using the analytical method I used to show that a ballpoint writing ink continues to 'dry' from 2 -5 years.

24. Plaintiff's Memorandum incorrectly claims that I disagree with most other forensic professionals on numerous matters that would affect my results.[28] This allegation is faulty because even when I have served as an expert in litigation opposing other ink dating experts, we have agreed on the method of analysis as it applies to ink dating. In the cases I have been involved with, it is extremely rare to have disagreement with respect to the GC/MS ink dating methodology I used in this case. Also, I have been retained as a consultant in numerous cases where I agree with the opposing ink dating experts testing and results. Plaintiff makes an unsubstantiated affirmation that has no basis.

25. Plaintiff's Memorandum claims that I "*...failed to consider the impact of storage conditions on the Subject Document, which Ms. Fischman testified had been stored in the back of a desk drawer with other papers, and thus was not exposed to ordinary air circulation*."[29] This theory is scientifically invalid. Plaintiff's counsel never asked me about this specific storage condition in my Deposition; however, documents stored in a drawer with other papers have been under the very

[28] See paragraph 2 on page 7 of 30 in Plaintiff's Memorandum.
[29] Ibid.

conditions that many studies have used as a standard condition, including studies I have performed. As I stated in my Deposition, only a drastic or extreme difference in temperature,[30] such as extreme cold, would have an impact on the aging parameters of the ink. Storage in a desk drawer with other papers is not an extreme condition that would have slowed the aging process of a document purportedly written in March of 2016. Also, the Q8 (000830/000831) document was removed from the drawer at some point (since it is subject to this litigation and was made available for me to test), but Plaintiff failed to identify the date when the document was removed and how it was stored afterward. Nonetheless, regardless of when the document was removed from the drawer, this type of environmental condition would not significantly impact the aging process of the written entries. Moreover, this document was purported to have been written more than 5 years before I conducted my testing, so the written entries would have been completely dried if the document was factually five (5) years old and stored in a drawer with other documents.

26. Plaintiff's Memorandum makes another incorrect claim, stating that "*LaPorte also failed to account for potential contamination with 2-PE from other sources, such as cosmetics, perfume, or other writings kept in the drawer with the Subject Document, or to take steps to ensure his work was free of sampling or measurement errors*."[31] My Deposition testimony was the opposite. The primary step to determine if there is contamination on a questioned document is to perform GC/MS testing on 'paper blank' samples near the ink entry. That is, testing is performed directly on the paper (without any ink) to determine if there is any foreign chemical around the ink being tested. I performed that testing, produced the results from my testing, and stated in my Deposition: "***Now, when I did my testing I removed paper blank samples from around the writing to determine***

[30] See LaPorte Deposition, page 183: 11-20.
[31] See paragraph 2 on page 7 of 30 in Plaintiff's Memorandum.

whether there was any significant contamination. I didn't -- I certainly didn't detect that."[32] Plaintiff's Memorandum misrepresents to the court that I did not test for contamination, but it is very clear from my Deposition testimony that I did.

27. Plaintiff's Memorandum incorrectly represents that I testified that the science of ink dating is far from settled, there are no objective standards, and that I used methods prone to error that do not allow the trier of fact to conclude with any reasonable certainty that the Subject Document is less than two years old.[33] This is not so. GC/MS analysis to estimate the age of an ink using the solvent loss ratio is well established and supported by numerous scientific articles dating back to 1985. It is generally accepted and has been shown that ballpoint inks will cease to measurably age after the period between 18 and 24 months, and there have been no relevant scientific papers to show that ballpoint inks continue to measurably age after 2 years – and there are certainly no instances where an ink has been shown to continue its aging process up to 5 years. As stated here, in the LaPorte Expert Report, and in my Deposition, GC/MS is an accurate and reliable analytical method to detect and measure 2-PE. And, it is well established that the test results from the GC/MS testing can be used to accurately and reliably determine that an ink is less than two years old. Plaintiff has taken out of context numerous ongoing studies that are attempting to establish various threshold levels and assign those to more specific time frames[34] rather than using the 25% solvent loss ratio threshold as very strong evidence to prove that an ink is less than 2 years old.

[32] See LaPorte Deposition page 149: 7-11.
[33] See paragraph 1 on page 13 of Plaintiff's Memorandum.
[34] See Koenig and Weyermann (2018). Ink Dating Part II – Interpretation of Results in a Legal Perspective where they propose the following:

- if R%-values ≥ 50%, then the questioned ink entry is younger than 150 days
- if R%-values ≥ 25%, then the questioned ink entry is younger than 300 days

28. Plaintiff's Memorandum states that ink analysis is "*an immature investigative technique* „„".[35] This is incorrect. Ink analysis is not an 'investigative technique'; it is based on fundamental chemistry and GC/MS, a widely acceptable analytical method used to identify and quantify materials. Plaintiff's Memorandum contradicts its own statement because it also posits that most ink dating experts "*are forensic crime lab investigators working exclusively for law enforcement agencies who are not available for hire by the private sector*."[36] This concedes that ink dating is currently used by government laboratories for criminal investigations and therefore, is widely used by others . While I was the Chief Forensic Chemist at the United States Secret Service and the Director of the Office of Investigative and Forensic Sciences at the United States Department of Justice, I was permitted to engage in civil matters that did not have the potential to impact the interests of the Federal government. There are other ink experts that are employed by the government and also are retained as ink dating experts in civil litigation.

29. Plaintiff's Memorandum also misrepresents a Motion to Strike my 2-PE testing in *Ceglia v. Zuckerberg*, 2012 WL 12995636, *6 (W.D.N.Y. June 28, 2012).[37] Plaintiff's Memorandum mischaracterizes the *Ceglia* ruling; in fact, the Court denied the motion to strike my expert report, ruling that "none of the information on which Plaintiff relies in support of his Motion to Strike provides even colorable support for the motion". Due in part to the mischaracterization and misrepresentations made by the Plaintiff in *Ceglia*, the Court found the Motion to Strike to be sufficiently weak that it ordered the Plaintiff "*to show cause, within ten (10) days ... why he [Plaintiff] should not be sanctioned for filing the Motion to Strike.*" My testimony was not

[35] See paragraph 2 on page 13 of Plaintiff's Memorandum.
[36] Ibid.
[37] Ibid – see footnote 13: Ceglia v. Zuckerberg, 2012 WL 12995636, *6 (W.D.N.Y. June 28, 2012) remarking on United States v. Rago, Docket No. 08–CR–10268–WGY (D. Mass.), a criminal action in which the Government, following an examination of LaPorte to determine whether LaPorte's PE test satisfied the requirements for expert testimony set forth.

withdrawn "ostensibly because the applicability of his GC-MS analysis under the circumstances of that case was discredited" as described in Plaintiff's Memorandum. This is a patently false accusation with no basis for support. The Plaintiff in *Ceglia* eventually was sanctioned by the court due, in part, to the misrepresentations about my GC/MS testing in Rago when I was employed with the United States Secret Service.

30. Plaintiff's Memorandum cites a 2011 paper that states, "*To present date, no two laboratories that do ink dating via solvent analysis use the same method*."[38] Plaintiff's Memorandum omits the last part of the sentence in this passage. The full passage reads as follows:

> *In fact, to the present date, no two laboratories that do ink dating via solvent analysis use the same method, however several laboratories participating in the International Collaboration on Ink Dating (InCID), a subgroup of the European Document Examiners Working Group) are striving to harmonize their dating methodologies inspired by the work of Bugler et al. [56]*.

I was a member of the InCID group for several years, including during my employment with the United States Secret Service. The 2011 publication is now outdated, and there was full agreement amongst members of InCID that GC/MS analysis of 2-PE and using the solvent loss ratio to assess the age of an ink was, emphatically, a validated methodology. The methodologies between countries (e.g., U.S., Canada, Germany) were nearly identical, but there were some minor nuances that would not have been expected to increase false positives. The group mostly deliberated how to establish threshold levels to conclude that an ink was placed on a document in more specific time intervals (e.g., 0-6 months old, less than 12 months old, less than 18 months old, less than 2 years old). It is not uncommon in any analytical methodology to have slight variations in a

[38] See paragraph 1 on page 14 of Plaintiff's Memorandum.

procedure, but the GC/MS method and numerous other key parameters, such as the extraction solvent used, heating temperature, and measurement criteria are consistent. There are certain steps in a standard operating procedure that may differ but not impact the rate of false positives, especially if the threshold level is set high and the time frame is extended sufficiently to mitigate false positives (e.g., less than 2 years old). This study and many studies cited in Plaintiff's Memorandum have focused on using specific time frames as I discussed to reach a conclusion (e.g., was the ink placed on a piece of paper 3 months, 6 months, 12 months, or 18 months ago). This publication was primarily written for agencies that did not perform ink dating but were considering implementing a standard operating procedure in their laboratory. Also, the publication makes a very strong recommendation that whatever procedure is implemented in a laboratory, it should be internally validated to ensure its accuracy and reliability. The GC/MS analysis I used in this case and the threshold values used for the solvent loss ratio have been internally validated in my laboratory.[39]

31. Plaintiff's Memorandum makes numerous statements with respect to my Deposition Testimony related to the general idea that ink dating may not be used to reach conclusion once an ink is beyond 6 months old. These statements are absolutely false, and Plaintiff has taken selective partial quotes from certain papers while ignoring the context. I have performed ink dating analysis on inks of known age, including in my validation studies, and have detected high levels of 2-PE and solvent loss ratios exceeding 25% in inks that were more than 12 months old, but less than 24 months. In fact it has been rare for me to detect high levels of 2-PE and a solvent loss ratio that exceeds 25% in documents that are known to be between 18 and 24 months based on testing of inks with a known age.

[39] LaPorte, G. A Validated Approach to Ink Dating Using Solvent Analysis. Presented at the American Society of Questioned Document Examiners (ASQDE) Annual Meeting, Charleston, South Carolina, August 21, 2012.

32. As an example, Plaintiff's Memorandum cites a 2003 book written by Brunelle and Crawford stating that "*ink dating technology which is based on GC/MS analysis cannot be used to date inks over six months old*."[40] The Brunelle and Crawford book was published in 2003 and neither author had expertise using GC/MS for the analysis of 2-PE. This book is not considered a treatise for GC/MS analysis of ink dating. I was asked to provide a review of the Brunelle and Crawford textbook, which was published in 2003.[41] Brunelle used an outdated ink dating methodology focused on the degradation of dye components that I critiqued at the time. The dye degradation method is no longer used in the forensic science community and has been criticized by numerous U.S. and international courts since that time.

33. The Plaintiff's Memorandum cites the Weyermann doctoral dissertation at the University of Lausanne in Switzerland, which was published in 2005, with most of the work taking place several months and possibly years in advance of 2005, so this reference is outdated with respect to her academic opinions as it related to the admissibility of evidence in Swiss courts.[42] Dr. Weyermann works in academia in Switzerland and, to my knowledge, has never testified as an expert witness in a U.S. court. Also, Weyermann (2005), at the time, was not using the litany of optimized conditions that have been developed and used in this case such as using 'paired ink sampling', GC/MS with SIM mode, 0.5 mm micro punches, and placement of the hole punches facing upwards in a ceramic welled dish to facilitate efficient and effective evaporation of 2-PE.

34. Plaintiff's Memorandum cites Fortini, 2000; Lociciro et al., 2004; Andrasko, 2003, which are all publications that used a completely different methodology and was early research to

[40] See paragraph 1 on page 15 Plaintiff's Memorandum.

[41] LaPorte, G. Published Book Review, "Advances in the Forensic Analysis and Dating of Writing Ink." Journal of Forensic Identification Volume 53(6), 2003\735.

[42] See paragraph 1 on page 18 of Plaintiff's Memorandum.

understand ink aging dynamics.[43] For example, Lociciro et al[44] studied two inks, but did find in their early work that, "*Phenoxyethanol being present in sufficient quantity (i.e. in easily detectable quantity over a long period of time) in the two studied inks*." The Andrasko publication showed that fresh inks can be distinguished from old inks. [45] Andrasko later published research in 2009 where he concluded that:

> "Solvents such as phenoxyethanol, phenoxypropanol, etc. will be liberated at lower temperatures from fresh inks in comparison to old ink samples. Table 1 illustrates the use of fractionated TD for a sample of ballpoint ink of different age .... The table shows clearly how the **relative amount of phenoxyethanol liberated ... decreases with the age of the ink**."[46]

35. Thus, Andrasko's work further supports the underlying theory that GC/MS analysis of 2-PE to estimate the age of an ink has extremely strong scientific foundations.

36. It is also important to note that many authors that published articles prior to 2010 were not using the SIM mode for GC/MS analysis, which allows for increased specificity and sensitivity of 2-PE, nor did they use an optimized sampling strategy that I used for the analysis of the documents in this case matter. While I was at the United States Secret Service, we performed validation testing to assess SIM mode, heating temperatures, heating time, evaporation rates from different types of paper, and extraction solvents.

37. Plaintiff's Memorandum erroneously reports that a "2018 paper in SCIENCE AND JUSTICE, by Koenig and Weyermann, entitled Ink Dating Part II – Interpretation of Results in a

[43] See paragraph 1 on page 18 of Plaintiff's Memorandum
[44] Dynamic of the ageing of ballpoint pen inks: quantification of phenoxyethanol by GC-MS.
[45] A simple method for distinguishing between fresh and old ballpoint pen ink entries.
[46] Andrasko, J. Some Examples of Applications of a Microthermal Desorption Device in the Forensic Laboratory. J Forensic Sci, September 2009, Vol. 54, No. 5.

Legal Perspective, reports obtaining false positives when analyzing 2-PE loss ratios with two values of 38 and 35 percent, for two different seven-year old samples."[47] This study only involved the analysis of writing inks monitored through a period of 304 days. As stated directly from the publication:

> "*This study aims at evaluating and comparing the different interpretation models based on the results obtained from the analysis of ink entries from 25 ballpoint pens over 304 days."*
>
> *"The different interpretation models were evaluated using three ageing parameters calculated from a population of 25 different inks. These inks were chosen because they covered a large range of ageing behaviours. They were provided by the LKA Munich that possesses a large collection of inks from several countries [14].* ***Ink lines aged during 4, 8, 23, 39, 52, 77, 101, 138, 165, 227, 274, and 304 days were analysed*** *using liquid extraction followed by GC/MS*." {emphasis added with bold}

38. Plaintiff has clearly misrepresented the Koenig and Weyermann study because they never studied inks that were more than 304 days old. Also, Plaintiff failed to articulate that this study was focused on identifying false positive rates when dating intervals are used, such as 0-3 months, 3-6 months, or less than 12 months. My opinion in this case primarily relates to the written entries on the Questioned Documents not being executed on their purported dates of execution in 2016.

39. Plaintiff also cites a presentation that was made at a conference by Patricia Giebink, Erich Speckin, and Jason Harner entitled The Dating of Writing Inks Through 2-Phenoxyethanol that has never been peer reviewed and published. The presentation concluded that "long term behavior of solvent evaporation isn't well known or understood."[48] As stated in my Deposition, there are

[47] See paragraph 2 on page 17 of Plaintiff's Memorandum.
[48] See paragraph 2 on page 17 of Plaintiff's Memorandum.

numerous concerns with this presentation, but most notably, no conclusions or relevant information can be drawn from this study because their focus was on making absolute measurements of 2-PE and not using the solvent loss ratio. Moreover, Mr. Speckin, one of the co-authors of this presentation, commonly performs ink dating using GC/MS. The following is an excerpt of Mr. Speckin's conclusion from an adjudicated case: "**Based on the results of the GC-MS Ink Dating, the entries made in the transaction register were not written on the dates purported**." (See **Exhibit 3** – Speckin Report).

40. Plaintiff's Memorandum cites an article from the EGYPTIAN JOURNAL OF CHEMISTRY, authored by El-Sabbah, Gomaa, El-Hefny and Al-Hawary, entitled Dating the Ballpoint Pen Ink Using Gas Chromatography-Mass Spectrometry Techniques which claims that for certain inks, the SLR ratio gets smaller as the document ages.[49] First, if that were the case for the writing ink used for Q8 (000830/000831) document then the SLR ratio would be higher than the 33% SLR I reported. Notwithstanding, the researchers used a scalpel to remove ink (not paired sampling using micro punches), which is known to create variation in measurements.[50] However, the researchers did conclude that, *"[t]he aging was studied kinetically by measuring the solvent concentration of 2-phenoxyethanol overtime by the GC-MS. The ink aging curves were plotted,* ***using the solvent volatility ratio was an effective means of determining the chronological age of the ballpoint pen inks***." [emphasis added with bold]. Therefore, this study further bolsters the underlying premise that ink aging can be measured reliably.

41. Plaintiff's Memorandum presented yet another misleading citation and states that "*LaPorte also claimed that his heating of samples at 70 degrees Celcius was superior to the 80 degrees used*

[49] See paragraph 1 on page 18 of Plaintiff's Memorandum.
[50] From Dating the Ballpoint Pen Ink Using Gas Chromatography-Mass Spectrometry Techniques: Two 1 cm samples of the examined inks on paper are removed using a sharp scalpel.

in a paper published by Dr. Valerie [sic] Aginsky entitled Determination of the Age of Ballpoint Pen Inc by Gas and Densitometric Thin-layer Chromatography."[51] First, I know that Dr. Aginsky uses 70 degrees Celsius for the solvent loss ratio method because I have reviewed many of his cases and I have watched him perform the testing. Second, Plaintiff is citing a completely different methodology – "Gas and Densitometric Thin-layer Chromatography" – which is not gas chromatography/mass spectrometry. Finally, this paper was published in 1994 and is completely outdated with respect to the optimized conditions used by most forensic ink dating experts.

42. Plaintiff's Memorandum also creates confusion with respect to my statements regarding issuing conclusions in the Grosvenor matter where I gave evidence in the United Kingdom.[52] I have issued reports and testified in Australia and the United Kingdom. Generally, those courts expect experts to opine using the strength of evidence (e.g., Very Strong Evidence, Strong Evidence, Weak Evidence, No Evidence). The 'Very Strong Evidence' opinion is the equivalent to the 'Highly Probable' opinion I used in my opinion regarding Q8 (000830/000831). Also, per the *SWGDOC Standard Terminology for Expressing Conclusions of Forensic Document Examiners*, Highly Probable can also be defined as "the evidence is very persuasive". Therefore, my conclusions regarding the 25% threshold are the same regardless of the location of the court.

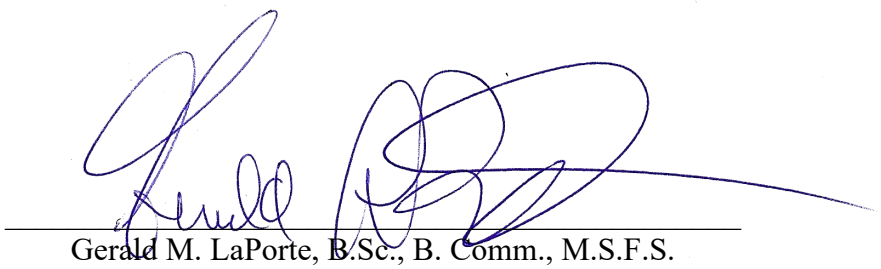
Summary

43. The GC/MS analysis of 2-PE that I used in this case is based on robust scientific foundations that have been progressively strengthened through peer reviewed and published research that began in 1985. For the GC/MS analysis, I adhere to a rigorous quality control protocol, including paired sampling and heating of the 0.5 mm micro punches while facing up;

[51] See paragraph 2 on page 18 of Plaintiff's Memorandum.
[52] See paragraphs 1 and 2 on page 20 of Plaintiff's Memorandum.

autotuning the GC/MS to ensure the instrument is operating effectively and efficiently; performing tests on solvent blanks (negative controls), 2-PE standard (positive control), and paper blanks; using an internal standard (o-Cresol) to ensure the accuracy of the test results; and performing duplicate testing to help ensure the results are precise.

44. The replicated testing showed 2-PE levels that exceeded 25% for both tests that were performed and there was no significant variation. The threshold level of 25% used for the solvent loss ratio is a conservative value that incorporates measurement uncertainty and error. Moreover, the risk of a false positive error diminishes as the purported age of the written entry/signature gets progressively older than two years old. Thus, an ink that is purportedly 5 years old (such as Q8) is far less likely than a younger ink to exhibit unexpected anomalous drying behavior that deviates from the generally accepted scientific theory that ballpoint inks cease to measurably dry after 24 months. Based on validation testing of known aged samples and my experience of testing written entries that are not in dispute and have a known age, I have never seen high 2-PE levels and a solvent loss ratio that exceeded 25% in an ink that was known to be more than 2 years old.



Gerald M. LaPorte, B.Sc., B. Comm., M.S.F.S.
Forensic Chemist and Document Dating Specialist